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January 21, 2000

U.S. Department of Transportation  
Docket No. FAA-1999-6265  
400 Seventh Street SW.  
Room Plaza 401  
Washington, D.C. 20590

Attention: Esta M. Rosenberg  
E-mail: <http://dms.dot.gov>  
FAX: 202-366-9313

Comments on the Notice of Proposed Rulemaking (NPRM) for Financial Responsibility Requirements for Licensed Reentry Activities.

Dear Ms. Rosenberg:

Space Access, LLC reviewed the reference document and is pleased to provide the following comments for consideration.

1. Top level issues which are crucial to the RLV industry are:

A. The FAA states that a seamless approach is used for a licensed launch immediately followed by a licensed reentry. This applies to suborbital trajectories and to, "those vehicles intended to spend minimal time on orbit and subsequently reenter purposefully upon activation or initiation of reentry system once readiness has been verified." Space Access agrees with the FAA that adopting a seamless approach to RLV regulation and financial responsibility is essential.

- (1.) A seamless approach is most desirable.
- (2.) The insurance industry intends to provide annual premiums covering all ground and flight operations.
- (3.) Current FAA licensing and coverage includes:
  - (a.) Vehicle or payload arrival at launch site in the U.S. through payload deployment and last action over which direct or indirect control is exercised.
  - (b.) Reentry readiness through reentry.

Since landing at U.S. launch sites qualifies as launch vehicle arrival, coverage immediately picks up until the release of a subsequent payload on the next launch. Therefore, the only period of non-coverage is the time between the last action of control and reentry readiness. FAA oversight and licensing of ground maintenance activities prior to launch are necessary to assure safe and reliable launch operations. FAA oversight of the activities conducted after payload deployment associated with reentry readiness prior to actual reentry are necessary to assure safe and reliable reentry operations. Therefore, Space Access suggest the FAA interpret all RLV activities, including those taking place after payload deployment and prior to the actual commencement of reentry activity, as linked to safe reentry operation. Space Access feels there is no ability to distinguish RLV on orbit activity that does not impact reentry safety and on orbit activity that does impact reentry safety. All flight activity directly or indirectly affects reentry safety.

Specifically not licensed and covered are on orbit activities not related to launch or reentry. The only on orbit activities not related to launch or reentry are those associated with systems not intended to be recovered (payloads or vehicles staying on orbit). An example of on orbit operations Space Access believes are intended to be excluded would be satellite maneuvering from one orbit to another such as the maneuvering from a Geosynchronous transfer orbit into a Geosynchronous orbit. However, if the on orbit operation is conducted by a transfer stage that was subsequently intended to be recovered it should be covered by license and financial responsibility requirements throughout. In essence, if the vehicle is never recovered for reuse it should not be covered and if it is intended to be recovered for reuse it should be licensed and therefore have financial responsibility requirements throughout the flight. Anything less than seamless coverage from launch through landing and the ground reuse activity will cause complications on missions which do not involve release of a payload.

Therefore, Space Access recommends a seamless approach to financial responsibility requirements throughout the mission consistent with mission based licensing and commercial third party liability insurance coverage.

B. Space Access is concerned about the cap on the amount of required liability insurance for third party claims. Space Access requests clarification of Section 450.9(c) wording concerning the FAA methodology used to determined "maximum liability insurance available on the world market at a reasonable cost." Is this applied to all applicants uniformly or on a case-by-case basis for each applicant? If not applied uniformly, the government places itself in a counter productive position whereby it is subsidizing less reliable vehicles.

C. Space Access is very concerned about passenger safety and the ability of the public to determine the safety of any flight vehicle. Therefore, the public should be afforded the same protection on a space flight that it is afforded on any other flight vehicle such as charter, commuter or major airline aircraft. The public should not be placed in the position of a satellite customer when it procures launch services. These launch service customers have the resources to investigate the safety and reliability of the services they are contracting for. The public, not having these resources, must be protected the same as they are on any other means of commercial transportation, by the enforcement of Department of Transportation regulations which assure their safety. Hence, Space Access recommends the use of Federal Aviation Regulation (FAR) airworthiness standards for commercial transport category aircraft as the starting point and basis for approval of any missions involving the carriage of passengers for hire. These standards and any additional standards the FAA establishes for space flight assure the public is safe for any commercial transportation whether by car, bus, train, ship, airplane or spaceplane.

D. In general, the proposed rules are to govern activity both currently under consideration and well into the future. Space Access would like to see rules that are universally applicable to all commercial space activity. This would include existing Expendable Launch Vehicles (ELVs), proposed Reusable Launch Vehicles (RLVs), and the launch and reentry activity. The rule should be consistent with all other rules and require as few exceptions, waivers or exclusions as possible. Incentives should be in place at all levels that encourage product and process improvement. This is the greatest method to move significantly towards improved public health and safety. Space Access believes differentiation between ELVs and RLVs will place one or the other at a competitive advantage or disadvantage and therefore should be avoided.

2. The following specific wording in the NPRM concerns Space Access:

A. The FAA proposed a new end point to "RLV Launch" as "payload deployment (or attempted payload deployment)." ELV launch is still defined as "through the point after payload separation when the last action occurs over which a licensee has direct or indirect control over the launch vehicle." This is declared as a "bright line reference point."

Space Access would disagree with the proposed RLV end point definition of launch. First, it establishes an inconsistency between ELVs and RLVs. Also, the proposed definition does not adequately address RLV capability or potential uses (satellite servicing, personnel delivery to ISS, micro-gravity research, etc.) which are not

strictly payload deployment. In addition to being a problem to correctly define the end of the launch responsibility, the existing definition does not clearly define the end of one mission and the start of another mission for RLVs that land at the launch site. Accordingly, Space Access suggests the FAA maintain the existing launch definition endpoint as “through the point after payload separation when the last action occurs over which a licensee has direct or indirect control over the launch vehicle.”

Space Access asks the FAA to clarify what license and insurance is required for flight test in order to determine what financial responsibility and government indemnification provisions might be in effect for any flight tests short of orbital or sub-orbital profiles. This is consistent with the FAA desire to protect the public and industry during these hazardous activities. Regulation and financial responsibility must be clearly established to cover RLV developmental flight test as this activity is more hazardous than actual launch and reentry activity with a proven vehicle. Nowhere in the existing codified regulation does it say this is covered or excluded.

Space Access notes that no changes to the definitions are proposed for either Section 401.5 or 450.3. If the FAA intends to change these definitions it should be reflected in the final codified regulations.

B. Regarding separation of reentry insurance requirements from the launch requirement for RLV operation in light of the FAA’s proposed mission approach to RLV licensing, Space Access encourages the FAA to adopt a seamless approach to licensing and financial responsibility. Therefore the use of separate insurance requirements for reentry and launch are opposed to this objective and should not be adopted.

C. The FAA defines reentry to begin when the vehicle is prepared specifically for reentry after payload deployment. Reentry includes, “those activities conducted in Earth orbit or outer space to determine reentry readiness and are therefore unique to reentry and critical to ensuring public health and safety and the safety of property during reentry.”

The FAA, pertaining to reentry, never defines “Earth orbit”, “outer space”, or what is considered “minimal.” In order for the rules to be clear and unambiguous these should be defined.

In addition, insurance requirements exist for the duration of the launch and reentry activity and up to 30 days after reentry. Space Access does not see this as a problem

since we intend to insure vehicles like aircraft on an annual basis and not on a mission or flight basis. Since we intend to insure the vehicles for both ground and flight, there is no problem with the 30-day additional requirement after reentry. However, this additional time limit definition may prove problematic if the RLV is performing another mission while still covered by previous mission reentry insurance coverage. Space Access suggests the reentry end point as the last action performed after landing to safe the RLV for ground servicing. This definition is consistent with the launch criteria end point, "through the point after payload separation when the last action occurs over which the licensee has direct or indirect control over the launch vehicle." This would allow a bright line demarcation between reentry and the next mission launch phase.

D. Regarding distinction of suborbital RLVs that are reentry vehicles and those that are not, Space Access suggest a consistent definition be applied. Both vehicles should be subjected to a single determination of financial responsibility. Space Access encourages the use of a seamless approach for coverage of all reusable vehicles since all activity either directly or indirectly effects long-term safety of launch and reentry.

E. Space Access believes financial responsibility determined for reentry separate from launch is going to be problem vice a mission based approach. The Space Access approach is to have continuous coverage for all vehicles and sees no difference in our insurance requirements. However, the paperwork required for separate risk management requirements will be much more difficult. The FAA requires complete documentation of financial responsibility to include: certification of insurance by company officials, filing insurance certificates with the FAA, FAA having access to individual insurance policies, insurer certification that insurance is adequate vice the regulations, and other specific documentation requirements. Mission based documentation of financial responsibility from launch start, vehicle arrival at the launch site, through reentry completion, the last action to safe the vehicle after landing, will be easier to document and provide than separate or overlapping policies.

- F. Passenger risk allocation questions were:
- (1.) Should passengers be regarded as any other customers who are expected to waive claims against other participants for injury, damage or loss as a result of launch or reentry?
  - (2.) Should the government play a role in establishing limits on liability for injury to space vehicle passengers?
  - (3.) Should indemnification be extended to cover risks of liability to passengers?

Space Access recommends a policy consistent with airline travel and FAA certification of commercial passenger transports. Passengers for hire are not just another customer and may not have the resources or legal understanding to waive claims as other launch service users do. The government should take a role in establishing limits of liability or injury to space vehicle passengers. This role should be two-fold: first, an increase in vehicle safety and reliability in the form of commercial transport airworthiness standards; and second, advocating limits of liability similar to the Warsaw treaty for international passenger travel. This gives the passengers and service providers certain limits and expectations of responsibilities and financial obligations and limits that liability. Indemnification is appropriate since a single passenger or group of passengers could try to collect in excess of the Maximum Probable Loss (MPL). The FAA uses \$3,000,000 for the value of life and therefore the licensee total liability could exceed this MPL if claims are filed in excess of this value.

G. Appendix A requests include: three-sigma landing or impact dispersion, malfunction turn data, and identification of debris casualty areas and the projected number and ballistic coefficient of fragments expected to result from each failure mode during reentry.

Space Access requires additional information to respond, including definitions of: landing, impact dispersion as different from landing, and malfunction turn data (tumble, trim) since these are not defined in existing documentation or codified regulation. The methodology for debris casualty areas and ballistic coefficient calculations is also requested.

H. The FAA establishes up to 90 days to accomplish an MPL calculation.

This seems unreasonable for a quick turn mission such as satellite replacement for a payload and vehicle previously flown. Space Access suggests the FAA establish 15 days as the limit to accomplish an MPL calculation for a mission profile and payload previously flown.

I hope the comments provided will be of assistance. If you have any questions or need clarification please contact at (303) 478-4745.

Very truly yours,

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SPACE ACCESS, LLC

A handwritten signature in cursive script, reading "Ronald K. Rosepink".

Ronald K. Rosepink  
Director, Flight Operations